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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/883,966	06/20/2001	Koichi Numata	109237	4446

25944 7590 08/08/2006

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER

HANDAL, KAITY V

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/883,966

Applicant(s)

NUMATA ET AL.

Examiner

Kaity Handal

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 16, 19-26 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1 and 21 are under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support for the limitation "predetermined effective diameter" anywhere in the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, and 21-23 are rejected under 35 U.S.C. 102(b) as being by Minet et al. (US 4,981,676).

With respect to claims 1 and 21-22, Minet teaches a fuel reforming apparatus (fig. 1) comprising: a reforming catalyst (17) that reforms raw gas including hydrocarbon fuel into reformed gas including hydrogen (col. 1, lines 11-16); and a filtering member/porous ceramic membrane (11) comprised of an interstitial material/support materials (col. 1, lines 31-34) including a plurality of gaps/pores having a predetermined effective diameter 10-15 microns (col. 3, lines 40-53) which would therefore be effective in removing/trapping soot, that carries the reforming catalyst (col. 1, lines 31-34) on at least one face of the filtering member/porous ceramic membrane (11) (col. 3, lines 53-55).

With respect to claim 2, Minet teaches wherein a raw material supply flow passage (16) that causes the raw gas to flow along a first face/inside reaction zone (16) of the filtering member/porous ceramic membrane (11) and that supplies the raw gas to the filtering member (illustrated); and a processed gas flow passage/interior (22) that causes reformed and filtered gas to flow along a second face of the filtering member/porous ceramic membrane (11).

With respect to claim 3, Minet teaches wherein: the raw material supply flow passage (16) causes the raw gas to flow along the first face of the filtering member/porous ceramic membrane (11) and substantially parallel thereto (as illustrated), and the processed gas flow passage/interior (22) causes the reformed and filtered gas to flow along the second face of the filtering member/porous ceramic membrane (11) and substantially parallel thereto (as illustrated).

With respect to claim 23, Minet teaches wherein said reforming catalyst (17) is carried by the filtering member/porous ceramic membrane (11) on at least one face thereof (col. 3, lines 52-55).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4-10, 12-13, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minet et al. (US 4,981,676), as applied to claims 1 - 3 above, and further in view of LaPierre et al. (US 6,348,278 B1).

With respect to claims 4 and 6, Minet discloses all claim limitations as set forth above including a nickel catalyst deposited on alumina support materials (col. 1; lines 32-34). Minet fails to show wherein the raw material supply flow passage (16), the filtering member/porous ceramic membrane (11) and the processed gas flow passage/interior (22) are constructed using a monolithic carrier made from the interstitial material. LaPierre teaches a hydrogen production apparatus comprising an alumina monolithic carrier (col. 5, lines 49-53) for the same catalyst (col. 5, lines 65-67) in order to provide support for reforming catalyst (col. 5, lines 35-38).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an alumina monolithic carrier in Minet's apparatus, as taught by LaPierre, in order to provide support for reforming catalyst.

With respect to claims 5, 8 and 13, LaPierre further teaches wherein the reforming catalyst is carried by the filtering member/wash-coated monolith matrix on the second face (col. 5, lines 39-43).

With respect to claim 7, Minet as modified teaches wherein the interstitial/support material forming the filtering member/porous ceramic membrane (11) is formed of a porous material.

With respect to claim 9, Minet as modified teaches wherein the first face of the filtering member on the side of the raw material supply flow passage is inactivated/made of alumina support (col. 5, lines 49-53).

With respect to claim 10, Minet teaches wherein the first face/inside reaction zone (16) of the filtering member/porous ceramic membrane (11) on the side of the raw material supply flow passage is inactivated by having an alumina support (col. 3, lines 38-55).

With respect to claim 12, Minet teaches wherein the reforming catalyst (17) is additionally carried by the filtering member/porous ceramic membrane (11) also on the first face on the side of the raw material supply flow passage/reaction zone (16).

With respect to claim 16, Minet as modified teaches wherein the interstitial/monolith/support material forming the filtering member/porous ceramic membrane (11) is formed of a porous material.

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With respect to claim 20, Minet teaches wherein the interstitial/monolith/support material forming the filtering member/porous ceramic membrane (11) is formed of a porous material.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minet et al. (US 4,981,676), as applied to claim 8 above, and further in view of Abe et al. (US 6,576,203 B2)

With respect to claim 11, Minet discloses all claim limitations as set forth above including the desire to generate hydrogen but fails to show wherein a partial oxidation catalyst that partially oxidizes the hydrocarbon fuel, wherein the partial oxidation catalyst is carried by the filtering member on the first face on the side of the raw material supply flow passage. Abe teaches a reformer having a partial oxidation catalyst that partially oxidizes the hydrocarbon fuel (page 5, paragraph [0094], lines 1-6), wherein the partial oxidation catalyst is carried by the filtering member of a honeycomb structure on the first face on the side of the raw material supply flow passage (page 6, paragraph [0105], lines 1-8) in order to generate hydrogen (page 5, paragraph [0094], lines 1-6).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a partial oxidation catalyst that partially oxidizes the hydrocarbon fuel, wherein the partial oxidation catalyst is carried by the filtering member, as taught by Abe, in order to generate hydrogen.

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8. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minet et al. (US 4,981,676), as applied to claims 21-22 above, and further in view of Hwang et al. (US 4,522,894), and in view of Doty et al. (US 5,098,455).

With respect to claims 24-25, Minet discloses all claim limitations as set forth above including a nickel catalyst but fails to show wherein reformer comprises soot removing means. Hwang teaches power production wherein soot causes a rapid increase in reactor pressure drop when a nickel catalyst is employed (col. 17, lines 16-20). Doty teaches gas filter regeneration comprising soot removing means/glow plug (fig. 1, 20) in order to burn off collected soot and regenerate filtering element (col. 5, lines 51-55) and therefore regenerate said nickel based catalyst.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide soot removing means to Minet's apparatus, as taught by Doty, in order to burn off collected soot on and regenerate filtering element and therefore regenerate said nickel based catalyst.

With respect to claim 26, Minet as modified teaches wherein the soot removing means/glow plug (fig. 1, 20) contacts soot that has been trapped by the soot trapping means with oxygen-containing gas/by means of burning (col. 5, lines 51-57).

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minet et al. (US 4,981,676), as applied to claim 1 above, and further in view of Jahnke et al. (US 6,149,859).

With respect to claim 19, Minet discloses all claim limitations as set forth above but fails to show wherein said reformer comprises a raw material preparing portion that gasifies hydrocarbon fuel and that mixes air with water vapors to prepare raw gas. Jahnke teaches a gasifier (fig. 1, 10) that gasifies hydrocarbon fuel (5) and that mixes air (6) (col. 5, lines 1-8) with water vapors (col. 5, lines 21-25) in order to prepare synthesis gas (col. 5, lines 1-8).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a gasifier in Minet's apparatus, as taught by Jahnke, in order to prepare the synthesis gas.

10. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minet et al. (US 4,981,676) in view of LaPierre et al. (US 6,348,278 B1).

With respect to claim 31, Minet teaches a fuel reforming apparatus (fig. 1) comprising: a reforming catalyst (17) that reforms raw gas including hydrocarbon fuel into reformed gas including hydrogen (col. 1, lines 11-16); and a filtering member/porous ceramic membrane (11) comprised of an interstitial material/support materials (col. 1, lines 31-34) including a plurality of gaps/pores having a predetermined effective diameter 10-15 microns (col. 3, lines 40-53) which would therefore be effective in removing/trapping soot, that carries the reforming catalyst (col. 1, lines 31-34) on at least one face of the filtering member/porous ceramic membrane (11) (col. 3, lines 53-55);

a raw material supply flow passage (16) that causes the raw gas to flow along a first face/inside reaction zone (16) of the filtering member/porous ceramic membrane (11) and that supplies the raw gas to the filtering member (illustrated); and a processed gas flow passage/interior (22) that causes reformed and filtered gas to flow along a second face of the filtering member/porous ceramic membrane (11). Minet fails to show wherein the reforming catalyst is carried by the filtering member on the second face.

LaPierre teaches a hydrogen production apparatus comprising an alumina monolithic carrier (col. 5, lines 49-53) for a reforming catalyst (col. 5, lines 65-67) wherein the reforming catalyst is carried by the filtering member/wash-coated monolith matrix on the second face (col. 5, lines 39-43) in order to provide support for reforming catalyst (col. 5, lines 35-38).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a reforming catalyst carried by the filtering member on the second face in Minet's apparatus, as taught by LaPierre, in order to provide support for reforming catalyst.

Response to Arguments

Specification

Objection made to the specification is withdrawn by the examiner due to applicant's amendment.

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Prior Art

Applicant's arguments filed 6/7/2006 have been fully considered but they are not persuasive. Minet teaches a fuel reforming apparatus (fig. 1) comprising: a reforming catalyst (17) that reforms raw gas including hydrocarbon fuel into reformed gas including hydrogen (col. 1, lines 11-16); and a filtering member/porous ceramic membrane (11) comprised of an interstitial material/support materials (col. 1, lines 31-34) including a plurality of gaps/pores having a predetermined effective diameter 10-15 microns (col. 3, lines 40-53) which would therefore be effective in removing/trapping soot, and wherein *said interstitial material/support materials carries the reforming catalyst* (col. 1, lines 31-34) on at least one face of the filtering member/porous ceramic membrane (11) (col. 3, lines 53-55). Table 2 describes the pore size of the "support layer"/support material having a diameter 10-15 microns (col. 3, lines 40-53). Therefore Minet's apparatus reads on all structural limitations of claim 1 and 21 as amended.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaity Handal whose telephone number is (571) 272-8520. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KH

2/22/2006


ALEXA DOROSHENK NECKEL
PRIMARY EXAMINER